



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2004CT45B

Title: Project Extension and Supplemental Funding for Investigating the Influence of Purging on Long-Term Remediation Compliance Monitoring

Project Type: Research

Focus Categories: Groundwater, Water Quality, Toxic Substances

Keywords: groundwater, purging, monitoring well, water quality

Start Date: 03/01/2004

End Date: 02/28/2006

Federal Funds: \$3,077

Non-Federal Matching Funds: \$6,153

Congressional District: 2

Principal Investigator:

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Abstract

Monitoring wells are used for remediation compliance monitoring across the country at contamination sites. Typically, the wells are sampled on a quarterly basis. The common sampling procedure is to purge 3-5 casing volumes of water before obtaining the sample. Most often, purging is performed using a bailer. Technical objections to the use of bailers have led to regulatory adoption of low flow purging and sampling with pumps. However, low flow purging and sampling increases the cost and time for sampling relative to the use of a bailer. Moreover, a number of recent studies question the need for purging prior to sampling at all. The high cost of disposal of purge water and the variability in results are issues that have forced examination of purging and sampling practices. Several studies have concluded that samples obtained without purging provide comparable data to that obtained with purging. Even if the data do not agree, one may argue that data obtained without purging may still be used for evaluating spatial and temporal trends in water quality for the purposes of remediation monitoring and regulatory compliance. Constituent concentrations obtained in monitoring wells represent averages of the vertical concentration distribution outside the well. Even with purging, the data obtained from wells is qualitative rather than quantitative. As such, this supports the use of no-purge

sampling for compliance monitoring. In fact, some regulatory authorities have started accepting data from non-purged samples for compliance monitoring.

The objective of this study is to assess the validity of the no-purge sample option for regulatory compliance monitoring. To meet this objective a field study is being performed at the University of Connecticut Motor Pool, which has a history of gasoline contamination and remediation. Site hydrogeology has been well characterized in three-dimensions in numerous past research projects. At the site, two locations with existing monitoring wells in close proximity to clusters of multilevel samplers were initially used for sampling. The absence of BTEX constituents, temporal decreases in MTBE levels following cessation of its use, and the need to change sampling protocols and constituents analyzed required modification of the original field sampling effort. Sampling was curtailed at one of the locations and efforts have focused on obtaining more detailed information at the other location. Because of the decrease in MTBE levels, inorganic constituents were evaluated. After several rounds of sampling, it was found that concentrations obtained for constituents that did not vary with depth were similar irrespective of the sampling protocol. The focus of subsequent sampling rounds was placed on constituents and parameters whose concentration varied with depth (e.g., T, EC, pH, ORP, DI, DO, turbidity, MTBE, Ca, Na and Cl). To enhance the consistency of field analyses and monitoring purging, we obtained from Geotech Environmental Equipment (at no cost to the project) a mini-flow cell (FlowBlock) and associated ion specific electrodes. Furthermore, the DEP LUST mobile laboratory is providing GC and GC/MSD analytical assistance (at no cost to the project). To date we have sampled six times. Amongst the different sampling methods we have found that there are concentration differences for those constituents that exhibit variations in formation concentration with depth. However, similarities in temporal trends are evident. We are requesting an extension of the project until June 2005 and additional student support. This will permit taking 6 more rounds of samples through the winter and spring. This will increase our data set for performing statistical comparisons. The results of this study will aid in resolving the issue as to whether purging is needed for compliance monitoring. Furthermore, it will aid in helping to interpret monitoring data obtained from wells in consideration of concentration averaging.